FTIR Autoloader

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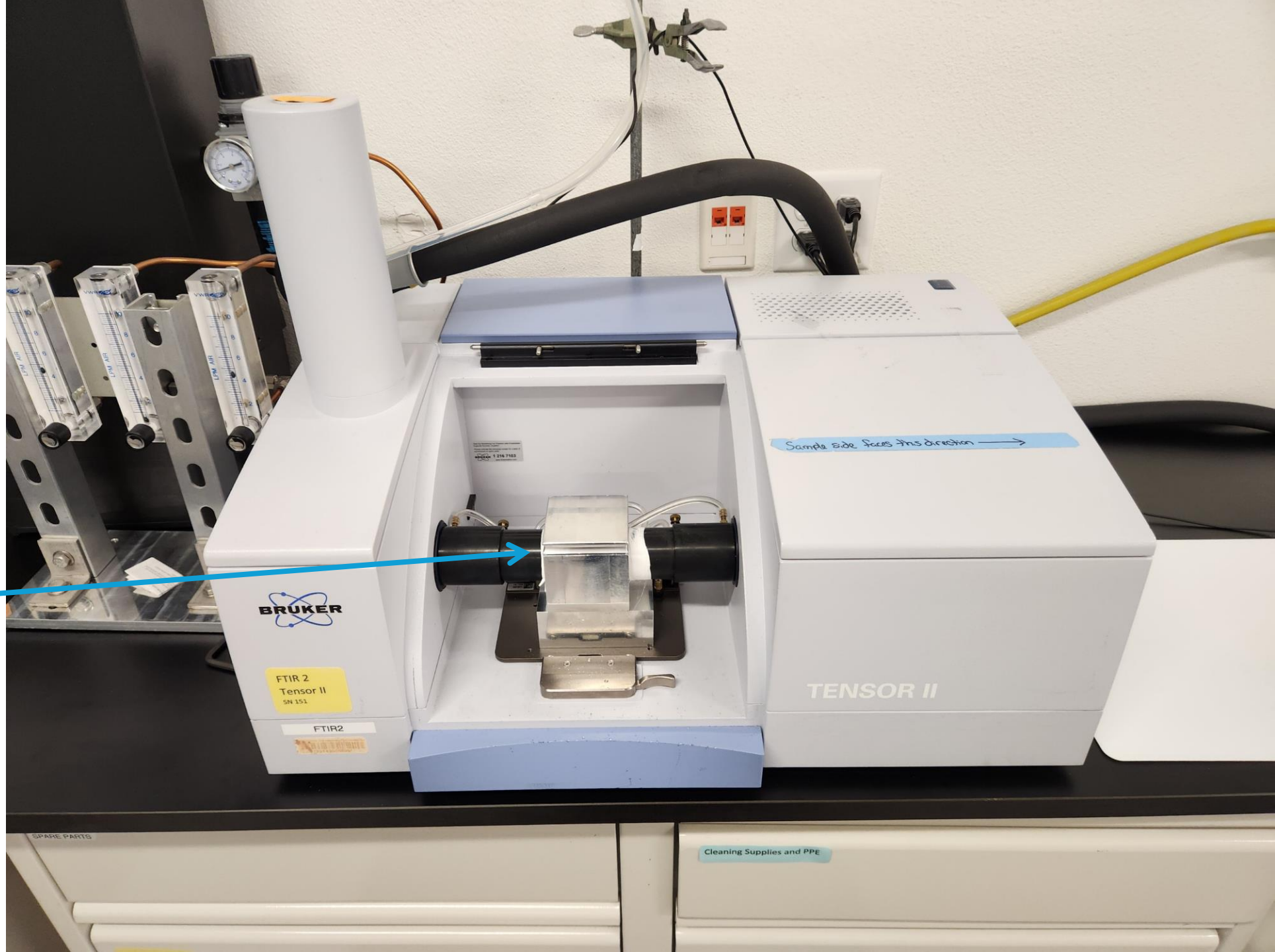
Air Quality Research Center
UC Davis

IMPROVE Steering Committee Meeting
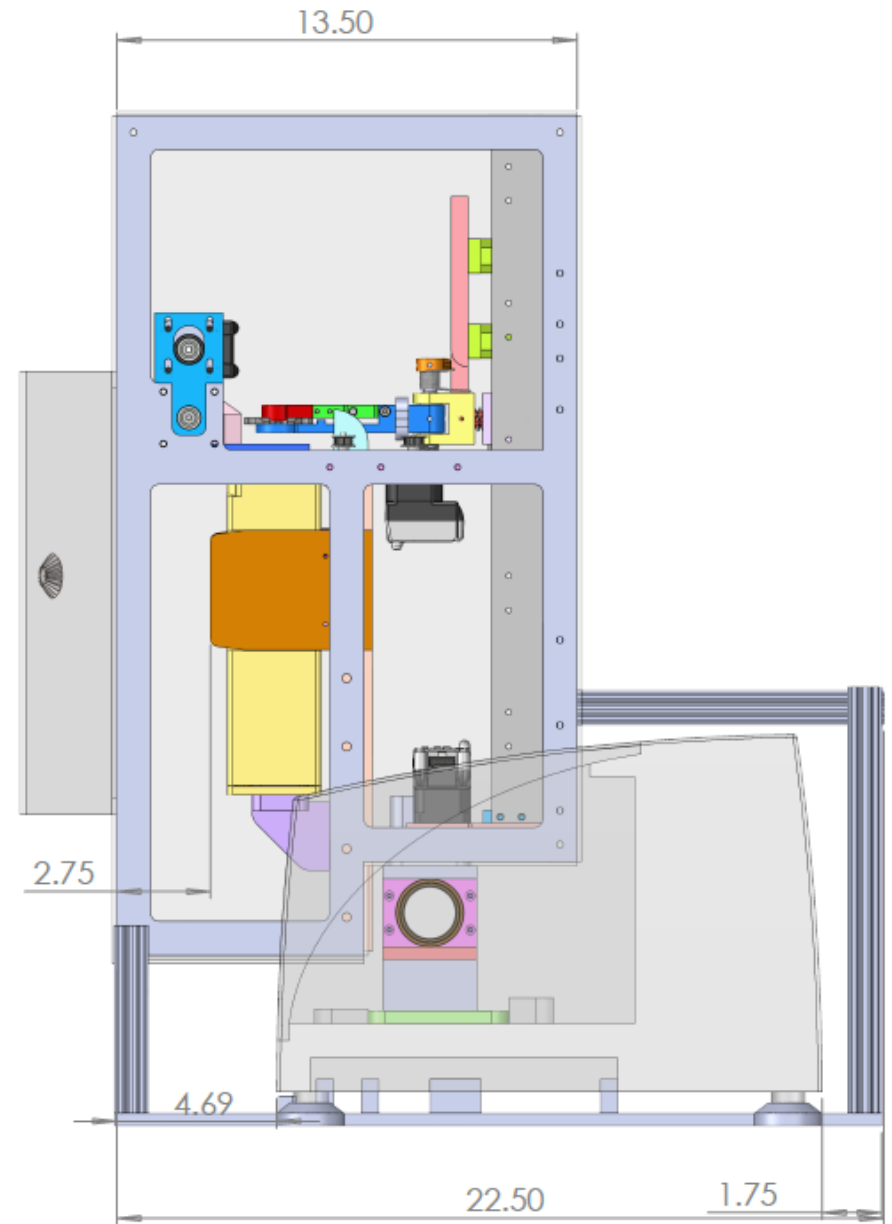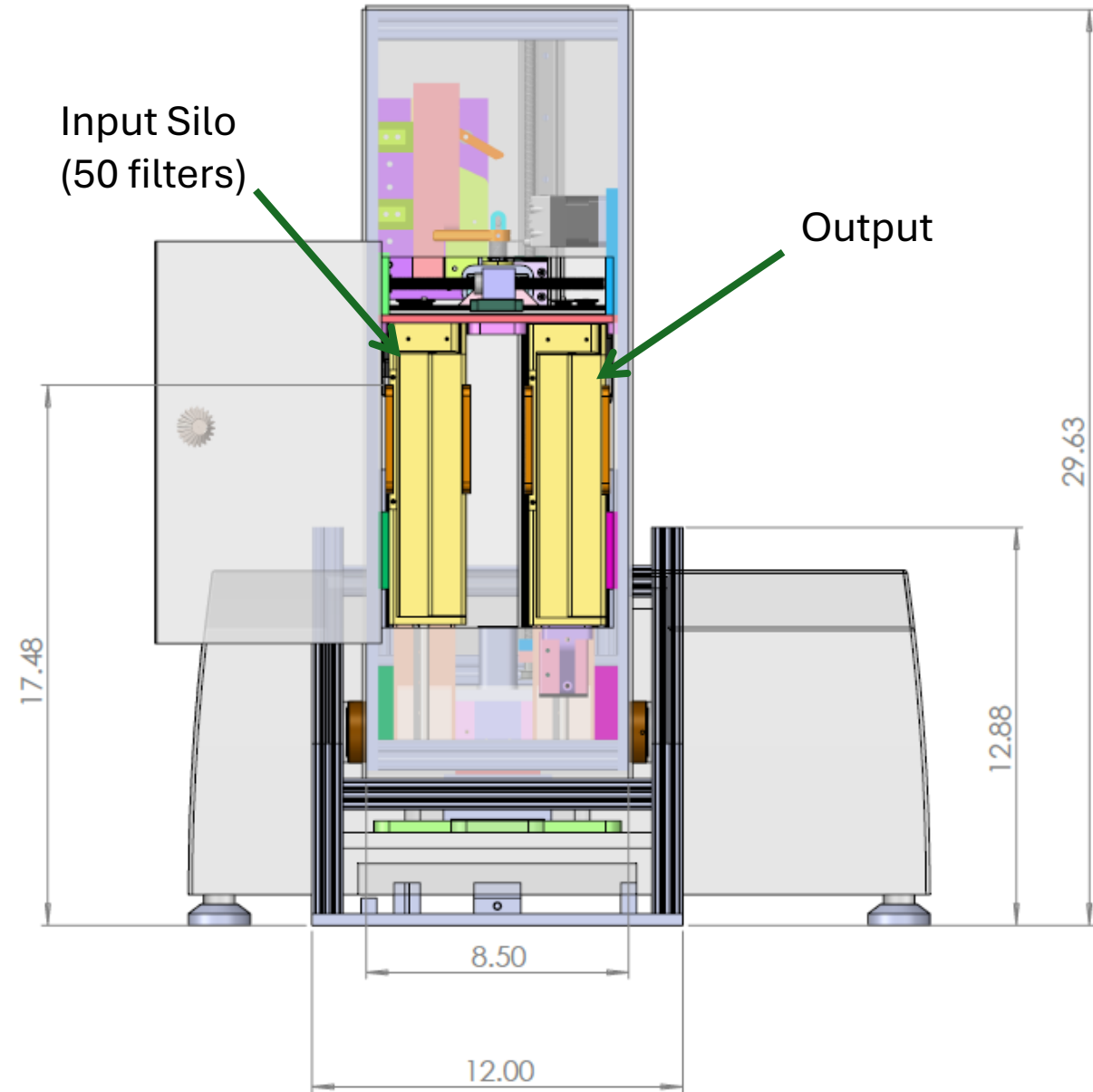Bosque del Apache NWR, New Mexico, October 29, 2024
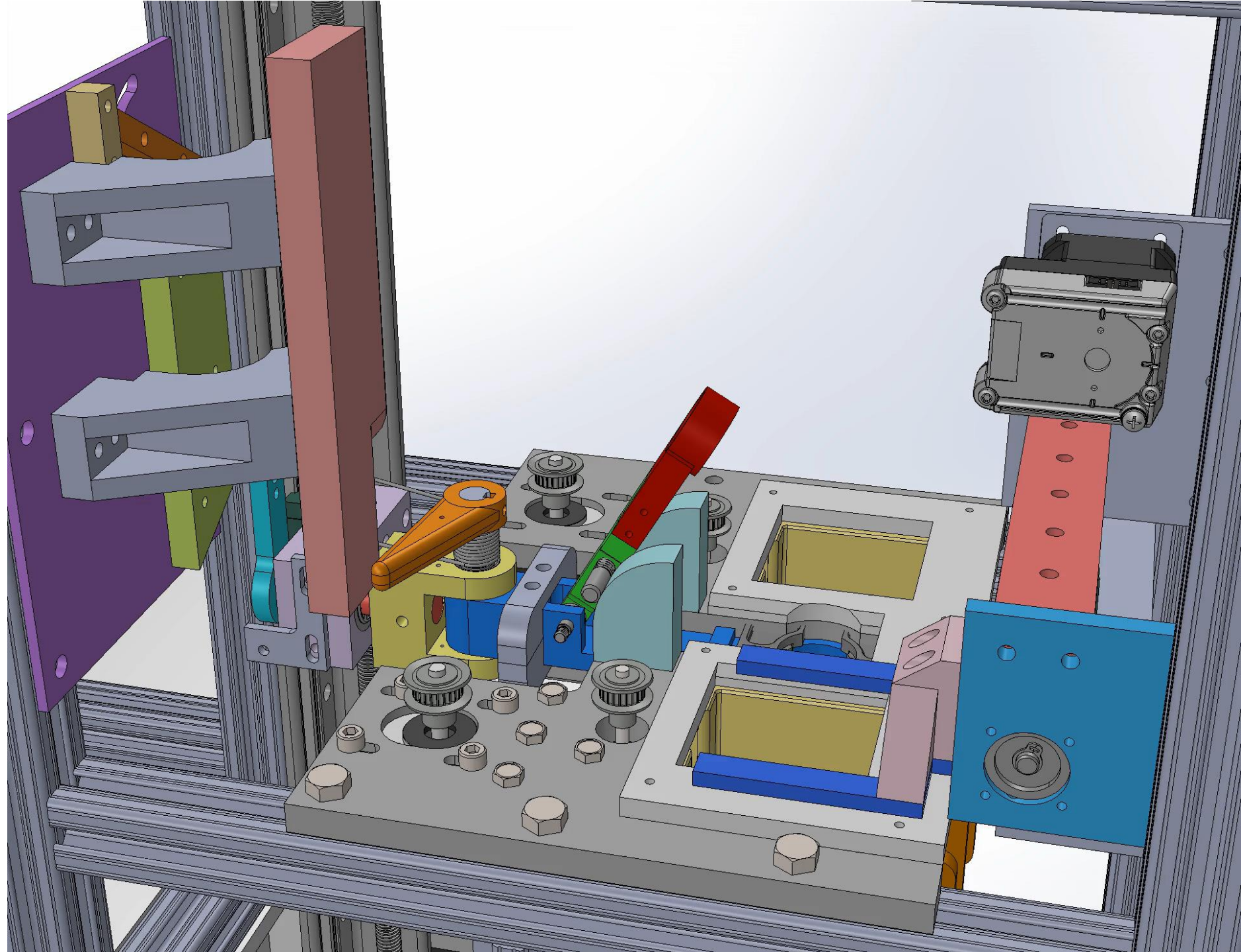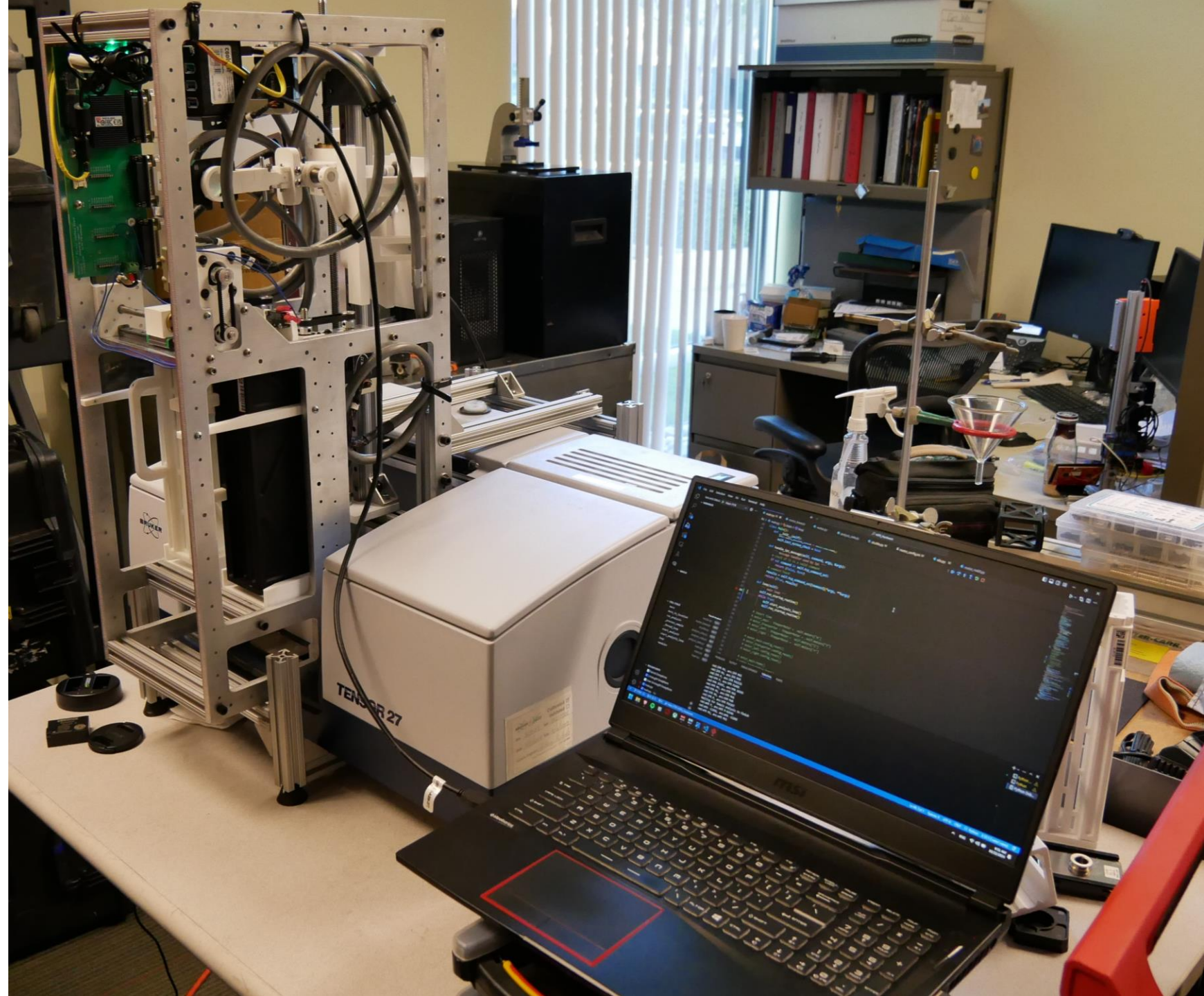
Current FTIR analyzer & sample chamber

Manual filter loading

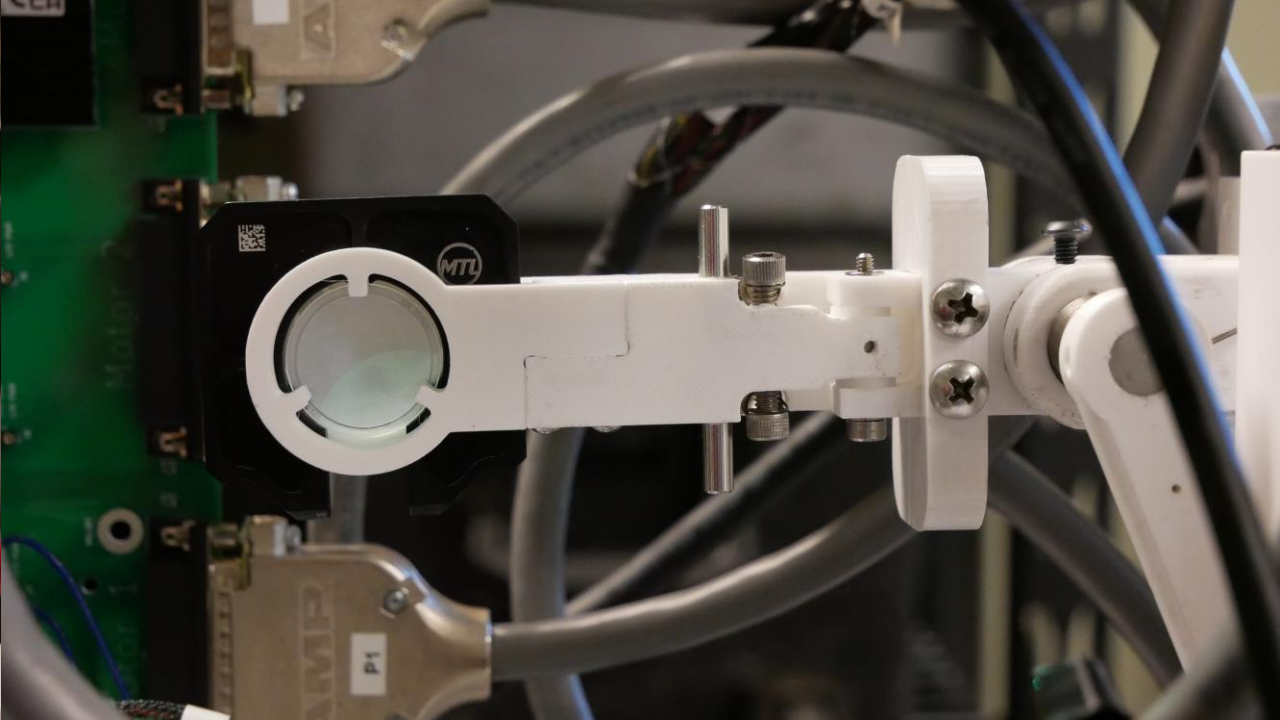# Proposed Sample Autoloader
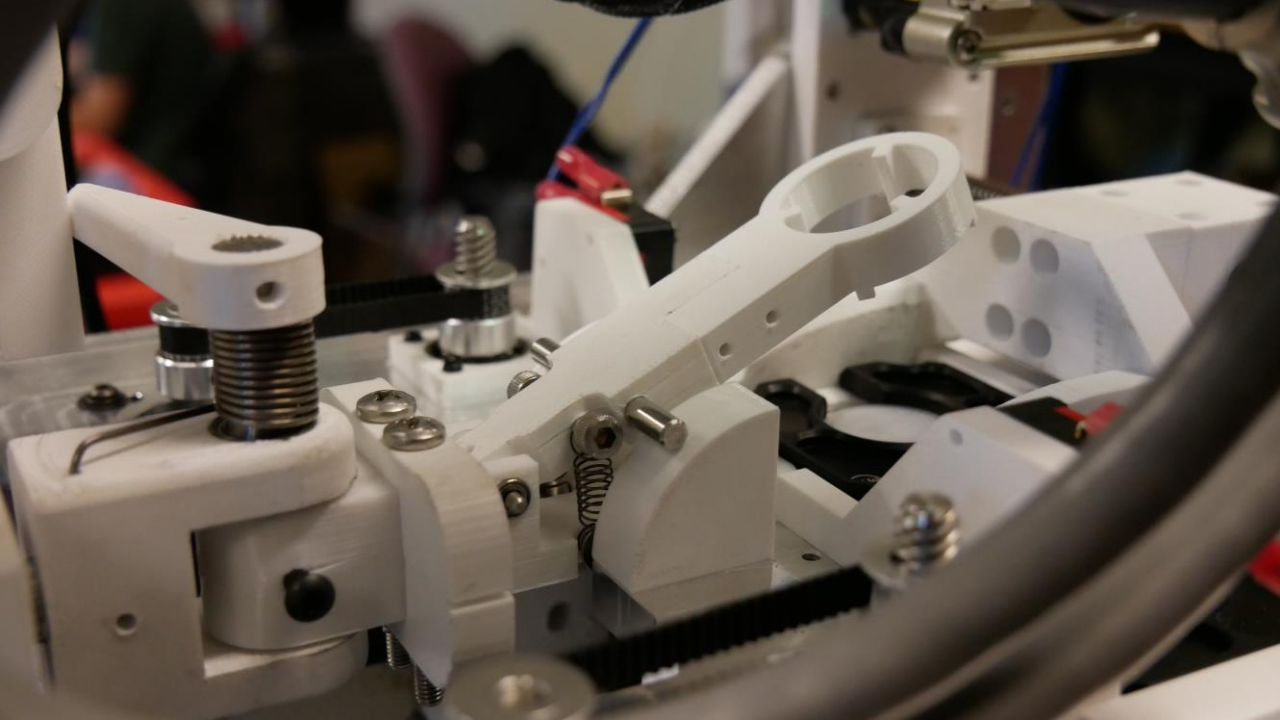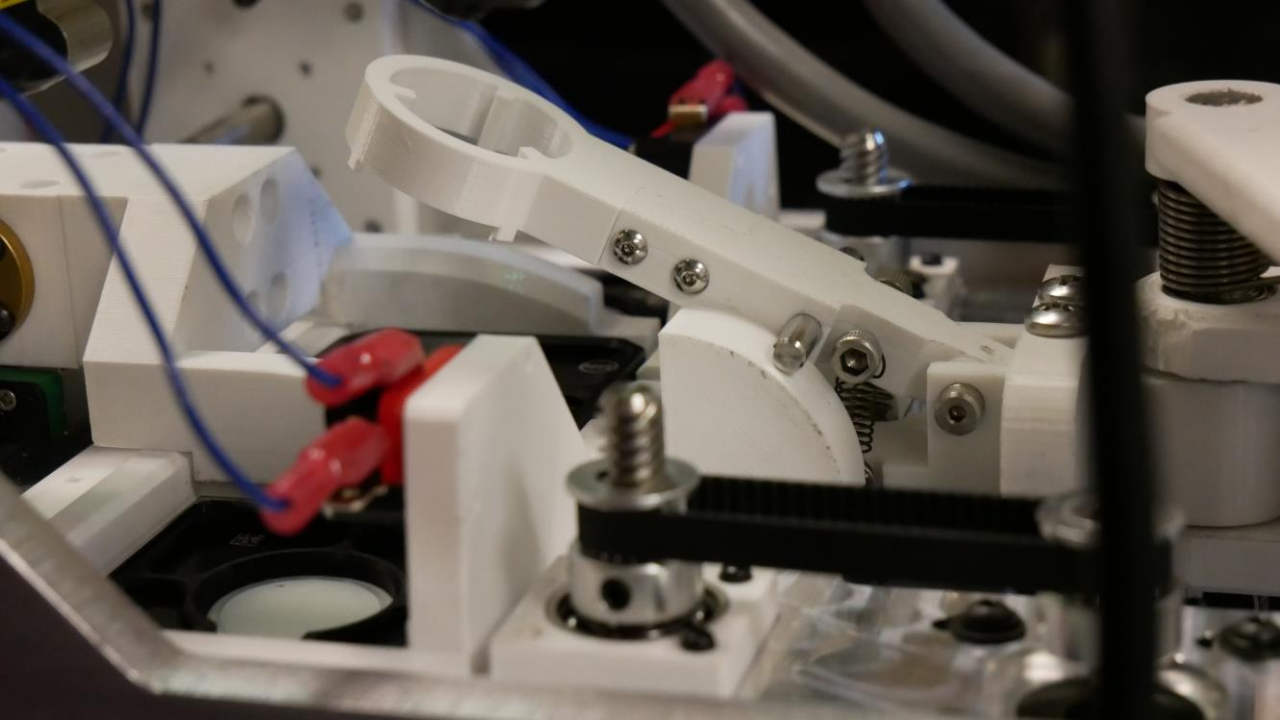
Input Silo
(50 filters)

Output
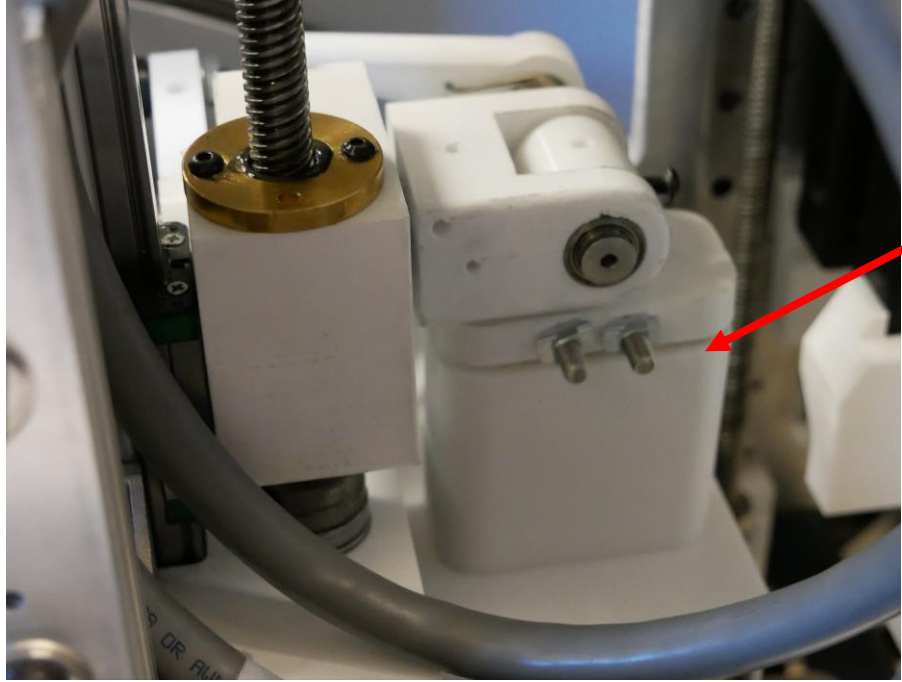
Design
Animation

Prototyped sample Autoloader

Working Prototype Video

Sample Grabbing Mechanism

- Holds filter in place directly on plastic rim
- Clamps onto MTL cassette with tension springs
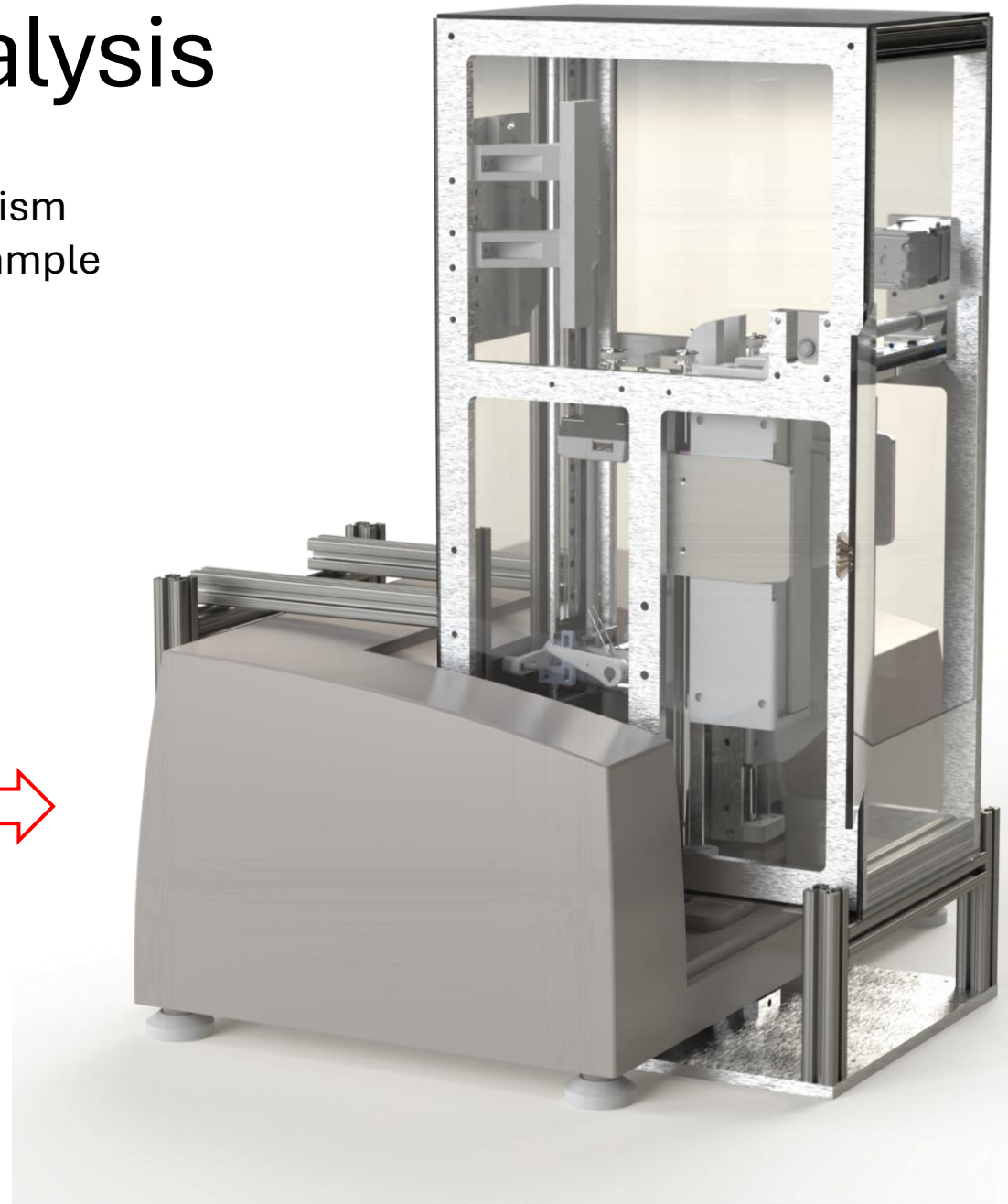- Replacement part for 25, 37, and 47mm filters

Designed for Efficient Analysis

- Arm mechanism seals onto sample chamber

- Final autoloader will be airtight

- Entire autoloader will be purged to reduce purging time in sample chamber after loading new filters

- Could reduce sample analysis time

HIPS-FTIR Cartridge (Silo) Interchangeability

Using the same sample handling device between the two automation machines allows easy, low-labor transitioning between analysis types
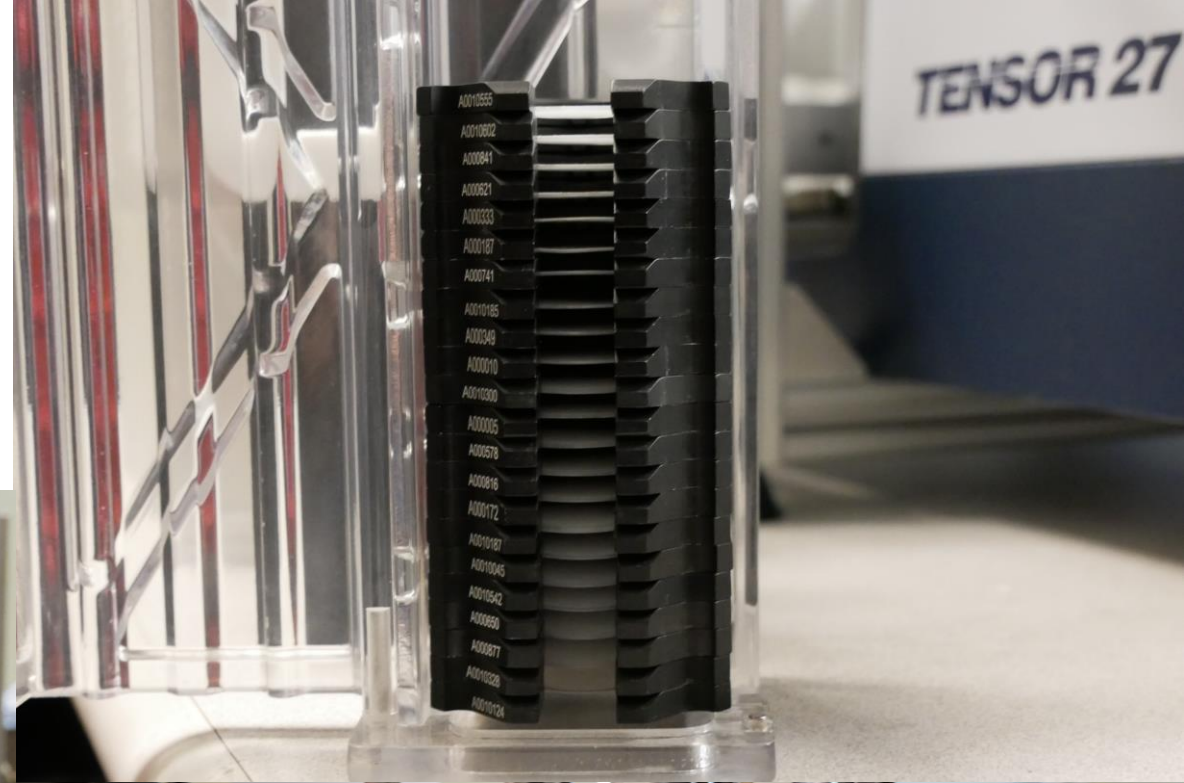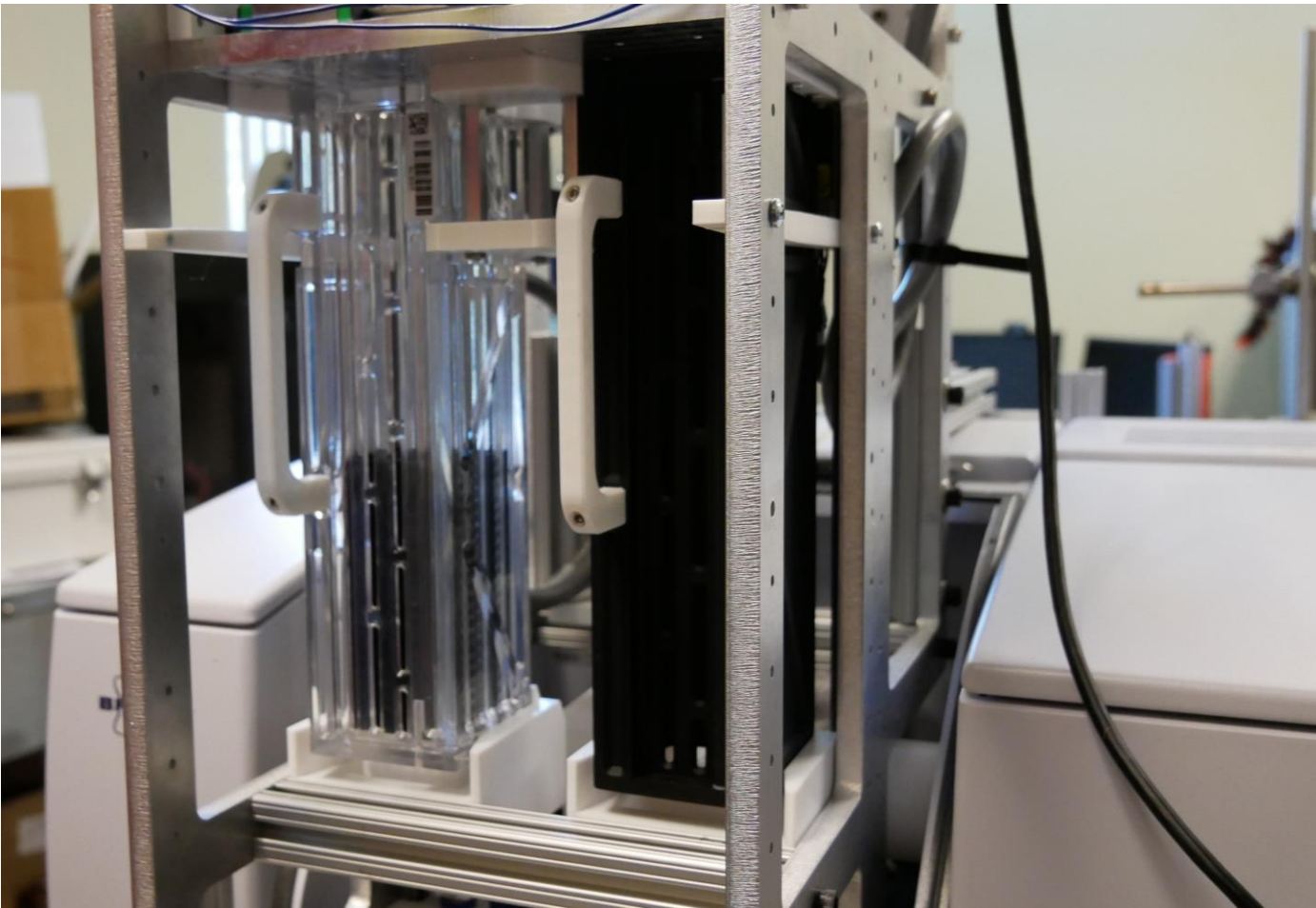
Additional Features and Improvements:

- Use the same Teflon filter holders as the Auto Weighing Chamber and HIPS – No filter transfers between holders.

- The Autoloader sits on a self-support frame – no additional weight on the FTIR analyzer.

- Copy the Python codes from HIPS to control the FTIR autoloader –reduce the development time.

- 3D-printed parts in the prototype will be replaced with different materials and machined.

- Will use a camera bar-code reader – automatically get filter's ID.

Thank you!